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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/732,570	12/08/2000	Mark Steven Boggs	99P07535 US04	6769

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Siemens Corporation
Intellectual Property Department
186 Wood Avenue South
Iselin, NJ 08830

EXAMINER

KANG, INSUN

ART UNIT	PAPER NUMBER
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2124

DATE MAILED: 01/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/732,570

Applicant(s)

BOGGS ET AL.

Examiner

Insun Kang

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2000 and 10 May 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 52-62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 52-62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

1. This action is responding to application papers dated 12/08/2000 and 5/10/2001.
2. Claims 1-51 and 63-83 have been cancelled (12/08/2000). Therefore, claims 52-62 are pending.

Claim Objections

3. Claims 54, 56 and 61 are objected to because of the following informalities: in claim 54, the word "code" is missing in the sentence of "restoring said original compiled once said status is captured."
4. Claims 56 and 61 are objected to because of the following informalities: In claims 56 and 61, the grammar of the phrase "fastest Boolean expressions" is incorrect. It is interpreted as "Boolean expressions, wherein the instructions are debugged relatively faster with the Boolean expressions."

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
6. Claims 59-62 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
7. Claim 59 recites the limitation "said method" in lines 21-22 and "said instruction" in line 30. There is insufficient antecedent basis for this limitation in the claim. The sentence "said method comprising the steps of" in lines 21-22 is interpreted as "said apparatus comprising of." Appropriate correction is required.

Regarding claims 60-62, these claims are objected for dependency on the above rejected parent claim 59.

The term "relatively" in claims 56-58 and 61 and 62 are a relative term, which renders the claim indefinite. The term "relatively" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 52-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roy et al. (US Patent 6,321,331), hereinafter referred to as "Roy," in view of Logan III et al. (US Patent 6,243,857), hereinafter referred to as "Logan."

Regarding claim 52, Roy discloses a method for debugging a program in real time and while said program is executed ("A widely used technique for debugging a program which is running in real time is called "tracing." Tracing involves recording the transactions performed by the computer as it executes the program code," Roy, col 1, lines 28-34; "the contents of the event history buffer can be recorded over time by the diagnostic device to provide a real time record of the processing events occurring in the

chip during real time. This real time record taken together with knowledge of the program code being executed provides a true picture of the processors' execution sequence in real time and thereby expedite debugging of code," Roy, col 3, lines 52-59; see also col 3, lines 13-32; col 7, lines 45-54).

Roy, however, does not disclose that the program is executed by a programmable logic controller. Logan discloses a programmable logic controller ("a manually-derived flowchart was converted to a ladder diagram which was then programmed into a programmable controller controlled a machine via an I/O device that produced the requisite signals for machine control," col 6, lines 18-42, lines 59-65) to automate monitoring and controlling of execution.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Logan to the method of Roy. One of ordinary skill would have been motivated to include the programmable logic controller to gain control of machinery in flexible automation schemes and to control essentially independent sequential processes at the same time (with ladder diagram).

Also, Roy does not disclose displaying a section of said program indicated by a user to be debugged. However, Logan discloses "a feature of display so as to alert the user quickly and to provide accurate change identification (col 5, lines 47-67). This feature of display "provides for ease of editing...with the debugging unit providing for ease of debugging an original program during a run-time execution of the program (col 3, lines 57-67; col 4, lines 37-67)."

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Logan to the method of Roy. One of ordinary skill would have been motivated to include the feature of display for the purpose of ease editing and debugging on the fly.

Roy further discloses saving original compiled code of the program ("...debugging computer which preferably has a copy of the program code stored therein," "The information collected by the computer 44 is associated with each line of code being executed by the ASIC by stepping through the copy of the code which is stored in the computer 44," col 7, lines 21-54; see also col 3, lines 1-32; col 4, lines 15-20); compiling said section of said program to be debugged in another section of memory (col3, lines 14-59); jumping to said another section of said memory during execution of said program when an instruction indicated to be debugged is to be executed (col 3, lines 1-42; col 4, lines 51-67) and capturing a status of said instruction as it is executed, wherein said program is debugged in real time and while said program is executed ("the contents of the event history buffer can be recorded over time by the diagnostic device to provide a real time record of the processing events occurring in the chip during real time. This real time record taken together with knowledge of the program code being executed provides a true picture of the processors' execution sequence in real time and thereby expedite(s) debugging of code," col 3, lines 1-59; see also col 4, lines 51-67).

Regarding claim 54, Roy further discloses the step of restoring the original compiled code once the status is captured (col 2, lines 62-67; col 3, lines 3-32, lines 42-59).

Regarding claim 53, this claim is another version of the claimed method discussed in claims 54, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth the above. To restore the original code once the status is captured as stated in claim 54, the step of returning to said compiled code in claim 53 is necessary and accordingly, this feature is inherent in Roy's disclosed method.

Regarding claim 55, Roy further discloses the step of instrumenting each instruction compiled in said another section of memory. Instrumentation is adding small code snippets at key points to existing code fragments to collect profiling information, to debug certain otherwise hard to solve faults, such as memory management issues and data races, or to analyze code which is loaded or even generated at run time. Roy discloses the method of instrumenting an instruction in column 4, lines 1-7, stating that "the contents of the cause register contain code which indicates an interrupt or exception...the instruction in IRAM pointed to by the program counter includes code indicating that it is a branch back to another instruction." See also col 3, lines 8-32, lines 19-32; col 4, lines 27-67; col 1, lines 35-40.

Regarding claim 56, Roy further discloses the step of storing a table relating instructions to boolean expressions, wherein said instructions are debugged faster with the boolean expressions ("the program branches to line 70 because the conditional

expression of line 50 is true based on the variable D=7," col 5 26-67; "When line 50 is executed (now for the second time) the first decoder indicates that a program counter increment (INC) in the execution of the program has occurred and shows an output of "001" because the condition (D=7) for the jump in line 50 is no longer valid. Line 60 is now executed and a jump to a location stored in a register occurs." col 6, lines 1-38).

Regarding claim 57, Roy further discloses the step of providing a table of pointers to instructions of said original compiled code, wherein said instructions are located in memory relatively faster during debugging ("Each program counter contains an index of the instructions in an associated IRAM and a pointer to the index as the instructions are executed by the processor. The cause registers store current information about interrupts, exceptions, and other processor functions," col 4, lines 15-20; see also col 4, lines 50-67; col 5, lines 1-25).

Regarding claim 58, Roy further discloses the step of limiting a data size of each compiled instruction, wherein execution of said instructions to be debugged is relatively faster and memory required to store said instructions is minimized ("when the history buffer is enabled, it captures forty-four bits of information from the cause register or program counter," co 6, lines 40-67).

Regarding claims 59-62, they are the apparatus versions of claims 52, 56 and 57 respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 52, 56 and 57 above.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Insun Kang whose telephone number is 703-305-6465.

The examiner can normally be reached on M-F 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on 703-305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-308-3988.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

IK
1/5/2004

QC



JOHN CHAVIS
PATENT EXAMINER
ART UNIT 2124